REFERENCES

CHISHOLM, A. H. 1951. The Story of the Scrub-birds. *The Emu*, 51: 89-112; 285-297.

SERVENTY, D. L., and H. M. WHITTELL. 1963. *Birds of Western Australia*, 3rd edn. Perth.

WEBSTER, H. O. 1962. Rediscovery of the Noisy Scrub-bird, *Atrichornis clamosus*. *W. Aust. Nat.*, 8: 57-59.

WHITTELL, H. M. 1943. The Noisy Scrub-bird *(Atrichornis clamosus)*. *The Emu*, 42: 217-234.

NOTES ON WESTERN AUSTRALIAN ORCHIDACEAE

By A. S. GEORGE, Western Australian Herbarium, South Perth.

III. *ELYTHRANTHERA*, A NEW GENUS FOR THE ENAMEL ORCHIDS

HISTORY AND INTRODUCTION

In 1810, Robert Brown described two new species of orchids from Port Jackson, New South Wales, under a new genus, *Glossodia*, namely, *G. major* and *G. minor*. He distinguished these from *Caladenia* thus "*Appendix* inter labellum et columnam. *Anthera* columnam membranacea dilatatum terminans." (An appendage between the labellum and column. Another terminating the column which bears membranous wings.) He derived the name from Greek words meaning "like a tongue," referring to the appendage, not the labellum—"Appendix linguam serpentis aemulans (unde nomen)." It is coincidental that the name in an anglicized sense is most appropriate to the plants later described from Western Australia, for they are glossy in appearance, while the Eastern ones are not.

The first western species was named *Glossodia brunonis* by Endlicher in 1839. He pointed out that it was an anomalous species on account of the extension of the column above the anther ("propter columnam supra antheram productam"). For this reason he placed it in a new section, *Elythranthera*. The name is derived from the Greek word, ελυτρον (elutron), generally used in reference to the protective wing case of coleopterous insects, and the modern Latin word *anthera*, i.e., referring to the protective hood over the anther.

In 1840, Lindley described a second W.A. species, *G. emarginata*, and in 1882 Fitzgerald described a third, *G. intermedia*.

Bentham, in his *Flora Australiensis*, retained Endlicher's section, although he corrupted the name to Eleutheranthera, which means "free" rather than "hooded" anther. The eastern species he placed in the section Euglossodia (true *Glossodia*). He was uncertain about this arrangement and wrote that "the two sections might almost be considered as distinct genera." This was also the opinion of Mrs. E. H. Pelloe in *West Australian Orchids* (1930). In this work, which was a collation of material rather than a full revision, she wrote: "the two sections . . . might easily be considered distinct genera."

It is apparent from this brief summary that up to the present no close study has been made of these orchids in their fresh state.

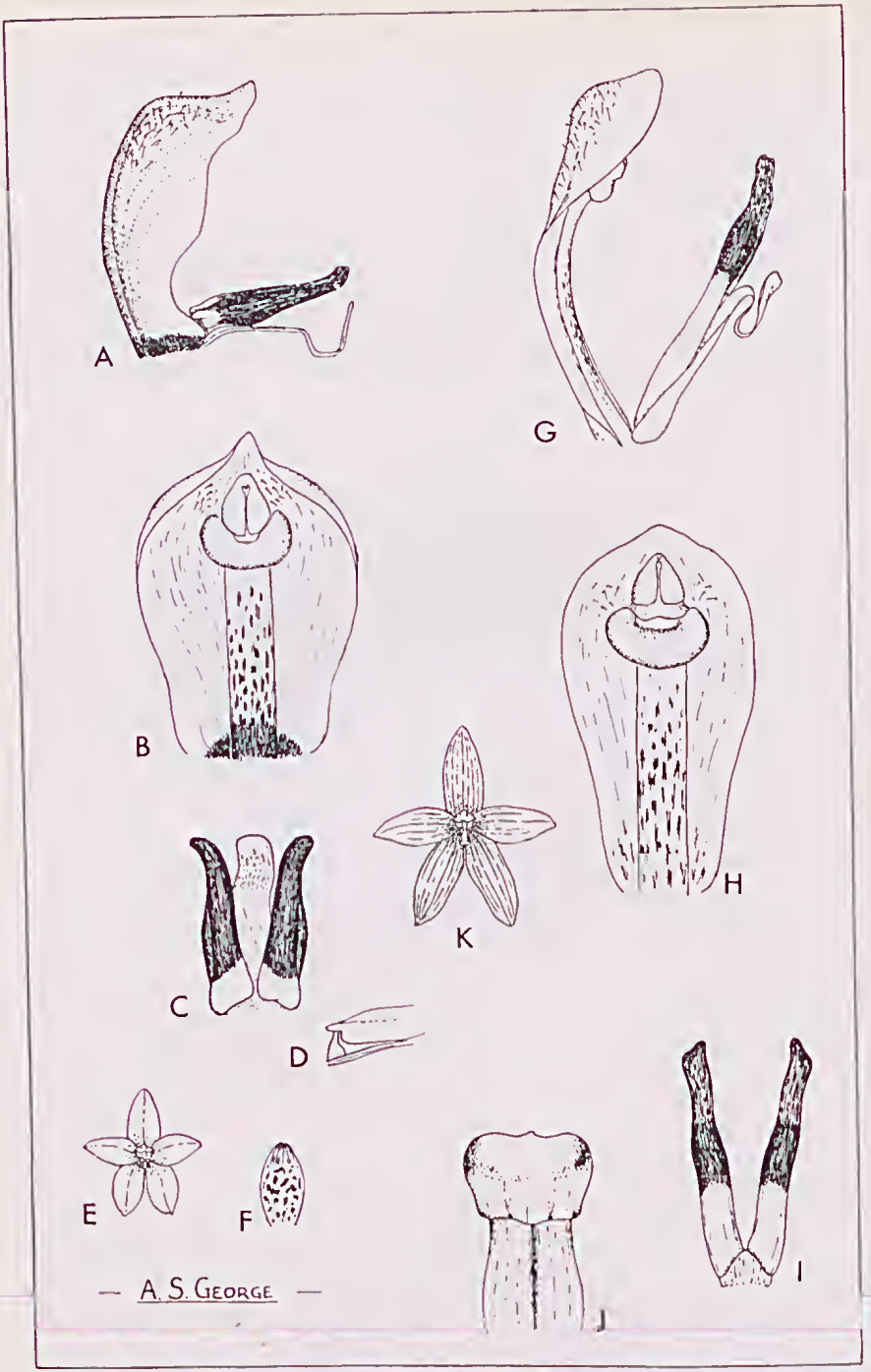

Fig. 1.—A-F, *Elythranthera brunonis*. A., Column, labellum and calli from side. B., Column, front. C., Calli and labellum from above. D., Attachment of calli on labellum. E., Flower. F., Dorsal sepal (outer surface. G-K, *Elythranthera emarginata*. G., Column, labellum and calli from side. H., Column, front. I., Calli from above. J., Labellum from below. K., Flower. (E., F. and K. less than natural size; all others enlarged.)

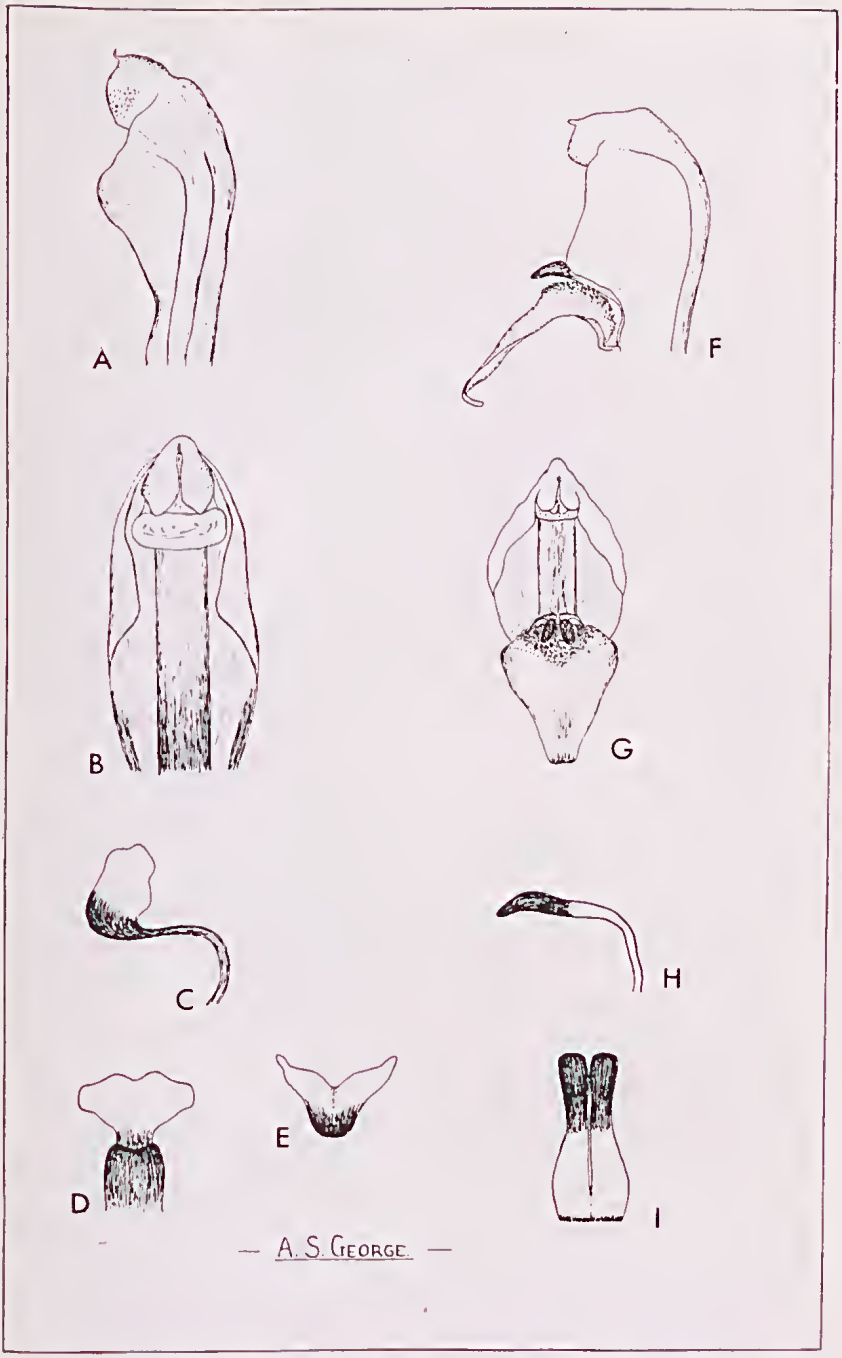

Fig. 2.—A-E, *Glossodia major*. A., Column from side. B., Column, front. C., Callus from side. D., E., Callus from rear and above. F-I, *Glossodia minor*. F., Column, labellum and callus from side. G., Same, from front. H., I., Callus from side and rear. (All enlarged.)

This has now been done, and it is considered neeessary to separate the western speeies under Endlieher's sectional name as a new genus. This opinion has been reached after eonsideration especially of the eolumn and labellum, which after all are the charaeteristie features of the orchids and therefore demand close attention.

THE DIFFERENCES BETWEEN *GLOSSODIA* AND *ELYTHRANTHERA*

The most striking feature of the floral structure of *Elythranthera* is the hooded eolumn. This is not found in any other Australian terrestrial orchids except some species of *Thelymitra*, which is quite a distinct genus. The labellum is membranous, and either sigmoid or recurved longitudinally towards the apex. It is not elawed but is flexible. There are two calli on its base; they are large in relation to the labellum and can be moved independently of it and of eaeh other. In *Glossodia*, the labellum is *Caladenia*-like, rather fleshy and moveable on a short claw. The callus is single, elavate in *G. major* and deeply bifid in *G minor*, and moves with the labellum as a single unit.

The glossy inner surfaee of the perianth segments of *Elythranthera* is unique among our orehids. It tends to beeome dull when the plants are dried, and henee may have escaped the notiee of the early European botanists. The spotted or blotehed outer surface also oeeurs outside this genus only in a few speeies of *Thelymitra* and *Diuris*.

These distinetions ean be tabulated as follows:—

	Elythranthera	Glossodia
Perianth:	Outer surface spotted or blotched, Inner surfaee glazed.	Similar to sectlon Eucaladenia of Caladenia. Outer surfaee uniform in eolour, Inner surface not glazed.
Labellum:	Membranous, strap-like, recurved or sigmoid towards apex, glabrous. Two calli on base of labellum, hinged, Individually moveable. Labellum sessile, flexible.	Caladenia-like, rather fleshy, finely puberulous in lower half. Callus at base of labellum elaw, either elavate or bifid. Labellum moveable on a short elaw together with its callus.
Column:	Wings extended to form an entire hood over the anther. Stigma reniform.	Caladenia-like. Anther terminal. Stigma oval.

DESCRIPTION OF *ELYTHRANTHERA*

Elythranthera (Endl.) A. S. George, gen. nov.

Genus Caladenia Glossodiaque affinitatibus, sed segmentibus perigonii intus nitentibus, extus maculatis; labello membranaeeo, ad apicem reeurvo sigmoideove, glabro; ad basem cum duobus appendieibus, singulatim mobilibus; columna alis lateralibus supra antheram cucullo terminantibus.

A genus allied to *Caladenia* and *Glossodia*, but perianth segments glossy within, spotted outside; labellum membranous, reeurved or sigmoid towards the apex, glabrous; two appendages near the base, individually moveable; eolumn with lateral wings ending in a hood over the anther.

Type speeies: *Elythranthera brunonis* (Endl.) A. S. George, comb. nov.

Under *Glossodia* three species were recognized from Western Australia, namely, *G. brunonis* Endl., *G. emarginata* Lindl. and *G. intermedia* Fitzg. After studying the specimens at the Western Australian Herbarium and comparing them with Fitzgerald's plate, I feel that his species is only a form of *G. emarginata*. The new combinations are therefore as follows:

Elythranthera brunonis (Endl.) A. S. George, comb. nov.

Glossodia brunonis Endl. Nov. Stirp., Dec. 16 (1839).

Caladenia brunonis (Endl.) Reichb. Beitr., 67 (1871).

Type: in Novae-Hollandiae austro-occidentalis colonia Swan River (Hügel).

This species, the Purple Enamel Orchid, is widespread in the South-West. It is commonest in sandy soil, e.g., on the coastal plain and on the sandplains. While showing some variation in size, the flower structure is quite constant. Only the degree of curvature of the labellum apex varies. Sometimes it is quite recurved, and sometimes bent down and then upwards. The perianth segments are broader for their length than those of *E. emarginata*. Occasionally an albino plant is seen.

The following is a list of the collections held at the Herbarium: 10 mls. N. of Watheroo, T. E. H. Aplin, 4.9.1958; 5 mls. E. of Piawaning, T. E. H. Aplin, 9.9.1959; Mahogany Ck., A. Purdie, 29.9.1900; Mundaring, C. A. Gardner, 30.8.1944; Swan View, B. T. Goadby, Oct. 1925; Queens Park, Miss M. E. Wood, Sept. 1919; Perth, A. Lea, Sept. 1895; Serpentine, A. Purdie, 23.9.1904; Peel Estate, B. T. Goadby, Oct. 1927; Ravenswood, C. A. Gardner, 912, 16.10.1920; Highbury, B. T. Goadby, 1924; Datatine, Miss L. Doutch, Sept. 1919; Kojonup, B. T. Goadby, Oct. 1924; Nillup, L. Horbury, 1934; Margaret River, Oct. 1914 (no collector recorded); Donnelly River, M. C. George, 25.10.1959; Albany, B. T. Goadby, Oct. 1902; King George Sound, B. T. Goadby, Nov. 1898; Thomas River (no collector or date).

There is an albino specimen collected from Pindalup by B. T. Goadby.

The following collections by the author were examined in their fresh state: Jandakot, 8.9.1957 and 23.9.1961; Wanneroo, 5.10.1957; Chittering, 5.10.1957; Muchea, 20.9.1961; Brookton Highway, 24.9.1961; Yarloop, 29.9.1957; Gwambygine, 22.9.1957; 14 mls. N.W. of Nannup, 15.11.1958; Denmark, 9.11.62 (M. C. George).

Elythranthera emarginata (Lindl.) A. S. George, comb. nov.

Glossodia emarginata Lindl. Gen. et Sp. Orch., 424 (1840).

Caladenia emarginata (Lindl.) Reichb. Beitr., 67 (1871).

Glossodia intermedia Fitz. Gard. Chron., 462 (1882).

Type: Swan River, Drummond, 1st coll.

This is commonly known as the Pink Enamel Orchid and has just as wide a distribution as the previous species. Generally it fav-

ours the swampy soils of the coastal plain or the clay and granite soils of the forest areas. Although one or two flowers are most usually borne on a stem, plants are occasionally found with up to four flowers. The perianth segments on the average are 5-10 mm. longer than *E. brunonis* but are relatively narrower. A large *E. brunonis* is comparable in size with a small *E. emarginata* but hybridization has never been observed. Fitzgerald's species is a small, dark-flowered specimen of *E. emarginata*, with a labellum slightly narrower than usual; the column is quite typical of the species, being more narrowly winged than in *E. brunonis*. The calli are also typical. It is noteworthy that a wide range of specimens as regards size has been collected from the type locality of *Glossodia intermedia*, Swan View, and surrounding districts.

The following is a list of the collections in the Herbarium: E. side of Moore R., C. A. Gardner, 7721, 9.10.1945; S. of New Norcia, C. A. Gardner, Oct. 1947; 5 mls. N. of Muchea, A. S. George, 3083, 16.10.1961; Mahogany Ck., A. Purdie, 8.9.1900; Sampsons Bk., G. F. Berthoud, Oct. 1902; Swan View (no collector or date); Swan View, B. T. Goadby (no date); Greenmount, W. B. Alexander, Oct. 1919; Cannington, A. Purdie, 7.10.1900; Jandakot, A. S. George, 359, 1.11.1959; Yangebup, B. T. Goadby, Oct. 1926; Cut Hill, York, ?O. H. Sargent, 15.9.1907; Highbury, B. T. Goadby, Oct. 1926; Kojonup, B. T. Goadby (no date); Marleyup (no collector or date); Benger Swamp, R. D. Royce, 4874, 11.10.1954; Nillup, L. Horbury, 1934; Albany, B. T. Goadby, Oct. 1898; Red Gum Pass, A. Morrison, 9.10.1902; W. of Solomons Well, A. Morrison, 25.10.1902; Bluff Knoll, A. S. George, 15.11.1959; Stirling Range, F. R. Bradshaw & O. Lipfert, Oct.-Nov. 1920; Esperance, W. H. Butler, Nov. 1956.

An albino form was collected at Werribee by C. B. Palmer, Oct. 1941.

The following collections were examined in their fresh state: Muchea, 24.10.1960; Red Hill, Toodyay Rd., 13.10.1961; Maida Vale, 27.9.1961; Cannington, 20.10.1957; Jandakot, 3.11.1957; 180 ml. peg, S.W. Highway, 7.12.1957; 14 mls. N.W. of Nannup, 15.11.1958; Bluff Knoll, Stirling Ra., 14.11.1959; Porongorups, 15.11.1959.

The following collections of the Eastern Australian Glossodiae were examined:

G major: 14 mls. S.E. of Nowra, E. & L. I. Cady, 28.8.1959; Nowra, E. & L. I. Cady, 17.8.1958; west of Nowra, L. I. Cady, 30.8.1955; Wyangla Dam, W. Brinsley, 29.9.1961.

G minor: Nowra, E. & L. I. Cady, 17.8.1958; Jamberoo Mt., L. I. Cady, 19.10.1959.

ACKNOWLEDGMENTS

My thanks are due to Messrs. L. I. Cady and W. Brinsley of N.S.W. for sending both herbarium and living material of *Glossodia major* and *G. minor;* and to Mr. R. D. Royce, Curator of the Western Australian Herbarium, for assistance and encouragement in writing this paper.

REFERENCES

BROWN, R. 1810. *Prodromus*, 325-6.
LINDLEY, J. 1839. *Swan River Appendix*, i-li.
LINDLEY, J. 1840. *Genera et Species Orchidacea*, 424.
ENDLICHER, S. L. 1839. *Novum Stirpium Decarum*, 2: 16.
ENDLICHER, S. L. 1846. *Plantae Preissianae*, 2: 9.
REICHENBACH, H. G. 1871. *Beiträge*, 67.
BENTHAM, G. 1873. *Flora Australiensis*, VI: 391-393.
FITZGERALD, R. 1891. *Australian Orchids*, II.v.
PELLOE, E. 1950. *West Australian Orchids*, 59-60.
RUPP, H. M. R. 1943. *The Orchids of N.S.W.*, 70-72.
ERICKSON, R. 1951. *Orchids of the West*, 77-79.

BREEDING OF AQUATIC BIRDS IN MID-WESTERN AUSTRALIA

By P. J. FULLER, Como.

Carnaby (1954) and Robinson (1955) have demonstrated the existenee of a double breeding season for land birds in the north-west, with peaks in the autumn and spring. Their nesting data have been analysed by Serventy and Marshall (1957) who eonclude that this bimodality of nesting frequency is due to summer and winter rains whieh stimulate breeding, though drought conditions may elim-inate one or both peaks. Rainfall during the summer period usually results from the activity of tropical eyelones which frequently eross the coast between Port Hedland and Carnarvon and travel in a south-easterly direction towards the Great Australian Bight (Gen-tilli, 1956); winter rain generally results from southern rain-bearing low pressure systems controlling the weather in this region.

The breeding seasons of aquatic-birds in the north-west were only partly dealt with by Carnaby and Robinson. During the last few years I have participated in several field trips in this region and collected data on the faetors stimulating the breeding of aquatic bird species and affecting their relative abundance. These data form the basis of this contribution.

OBSERVATIONS IN 1960

In February 1960, due to low pressure systems being active in the tropics, abnormally widespread torrential rain was received over most of the north-west and eentral western regions of the State. In the Murchison and Gaseoyne districts pastoral stations recorded up to 21 inches, most reeording in excess of five ineches. Widespread flooding in many localities, and overflowing of the larger river sys-tems ineluding the Murchison, Gaseoyne and Ashburton Rivers, re-sulted in most of the lake systems in the region being filled with large expanses of water up to several feet deep.

The filling of these lakes had a profound effect sinee not only were several aquatie bird species recorded in this region for the first time, but they were present in great abundanee. Observations on these speeies are set out below.